

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1                   1.       (Previously Presented) A computer-implemented method of identifying  
2 whether a test subject is suffering from one or more systemic autoimmune diseases selected from  
3 the group consisting of systemic lupus erythmatosus, scleroderma, Sjögren's syndrome,  
4 polymyositis, dermatomyositis, CREST, and mixed connective tissue disease, said method  
5 comprising:

6                   (a) receiving a test data set for the test subject, wherein the test data set is  
7 obtained by subjecting a biological sample of the test subject to a set of one or more tests that  
8 produce values representing levels of a plurality of autoantibodies present in the sample such  
9 that the test data set has values representing levels of said plurality of autoantibodies;

10                  (b) storing a plurality of reference data sets, including i) reference data sets  
11 obtained for each of said one or more systemic autoimmune diseases by subjecting biological  
12 samples of reference subjects, each known to have one of said one or more systemic autoimmune  
13 diseases, to said set of one or more tests, and ii) reference data sets obtained by subjecting  
14 biological samples of reference subjects known to not have one of said one or more systemic  
15 autoimmune diseases to said set of one or more tests, such that each stored reference data set has  
16 values representing levels of said plurality of autoantibodies, and wherein each stored reference  
17 data set is associated with none or one of said systemic autoimmune diseases;

18                  (c) comparing the test data set and the stored reference data sets by applying a k-  
19 nearest neighbor algorithm to produce a statistically derived decision indicating whether the test  
20 subject is suffering from none, one or more of said systemic autoimmune diseases; and

21                  (d) identifying which of said systemic autoimmune diseases the test subject is  
22 suffering from if the statistically derived decision indicates that the test subject is suffering from  
23 one or more of said systemic autoimmune diseases.

2. (Previously Presented) A method in accordance with claim 1 in which step (c) produces a statistically derived decision indicating whether said test subject is suffering from two of said systemic autoimmune diseases.

3. (canceled)

4. (canceled)

5. (Original) A method in accordance with claim 1 in which said plurality of autoantibodies numbers from 10 to 100 autoantibodies.

6. (Original) A method in accordance with claim 1 in which said plurality of autoantibodies numbers from 15 to 25 autoantibodies.

7. (Previously Presented) A method in accordance with claim 1 in which said plurality of autoantibodies comprises antibodies to at least fifteen of the following antigens:

SSA 60,  
SSA 52,  
SSB 48,  
Sm BB',  
Sm D1,  
RNP 68,  
RNP A,  
RNP C,  
Fibrillarin,  
Riboproteins P0, P1, and P2,  
dsDNA,  
Nucleosome,  
Ku,  
Centromere A,

17 Centromere B,  
18 Scl-70,  
19 Pm-Scl,  
20 RNA-Polymerases 1, 2, and 3,  
21 Th,  
22 Jo-1,  
23 Mi-2,  
24 PL7,  
25 PL12, and  
26 SRP.

1 8. (Previously Presented) A method in accordance with claim 1 in which said  
2 plurality of autoantibodies comprises antibodies to each of the following antigens:

3 SSA 60,  
4 SSA 52,  
5 SSB 48,  
6 Sm BB',  
7 Sm D1,  
8 RNP 68,  
9 RNP A,  
10 RNP C,  
11 Fibrillarin,  
12 Riboproteins P0, P1, and P2,  
13 dsDNA,  
14 Nucleosome,  
15 Ku,  
16 Centromere A,  
17 Centromere B,  
18 Scl-70,

19 Pm-Scl,  
20 RNA-Polymerases 1, 2, and 3,  
21 Th,  
22 Jo-1,  
23 Mi-2,  
24 PL7,  
25 PL12, and  
26 SRP.

1 9. (Previously presented) A method in accordance with claim 1 in which said  
2 reference data sets represent from 100 to 10,000 biological samples from reference subjects  
3 known to have systemic autoimmune diseases of known identity.

1 10. (Previously presented) A method in accordance with claim 1 in which  
2 said reference data sets represent from 200 to 2000 biological samples from reference subjects  
3 known to have systemic autoimmune diseases of known identity.

1 11. (canceled)

1 12. (Original) A method in accordance with claim 1 in which said biological  
2 sample from said test subject is a member selected from the group consisting of serum, plasma,  
3 urine, and cerebrospinal fluid.

1 13. (Original) A method in accordance with claim 1 in which said biological  
2 sample from said test subject is serum.

1 14. (Previously presented) A method in accordance with claim 1 in which the  
2 one or more tests include a test based on analysis by immunoassay.

1 15. (Previously presented) A method in accordance with claim 1 in which the  
2 one or more tests include a test based on analysis by immunoassay with fluorescence detection.

1                   16.     (Previously presented) A method in accordance with claim 1 in which said  
2     one or more systemic autoimmune diseases includes systemic lupus erythmatosus.

1                   17.     (Previously Presented) A computer-implemented method of diagnosing  
2     whether a test subject is suffering from one or more systemic autoimmune diseases selected from  
3     the group consisting of systemic lupus erythmatosus, scleroderma, Sjögren's syndrome,  
4     polymyositis, dermatomyositis, CREST, and mixed connective tissue disease, said method  
5     comprising:

6                   (a) receiving a test data set for the test subject, wherein the test data set includes  
7     data values obtained by analysis of a biological sample of the test subject and wherein the data  
8     values of the test data set represent levels of each of a plurality of autoantibodies;

9                   (b) storing a plurality of reference data sets to a database, wherein the reference  
10    data sets include data values obtained by analysis of biological samples of reference subjects  
11    each known to have at least one of said one or more systemic autoimmune diseases, wherein the  
12    data values of each reference data set represent levels of each of said plurality of autoantibodies,  
13    and wherein each of the stored reference data sets is associated with one of said systemic  
14    autoimmune diseases; and

15                  (c) applying a k-nearest neighbor algorithm to the test data set and the reference  
16    data sets from the database to produce a statistically derived decision indicating whether the test  
17    subject is suffering from one or more of said systemic autoimmune diseases, wherein the  
18    statistically derived decision includes an indication of one or more of said systemic autoimmune  
19    diseases.

1                   18.     (Previously Presented) The method of claim 17, wherein the autoantibody  
2     levels in the test and reference data sets are determined using the same multianalyte analysis  
3     tests.

1                   19.   (Currently Amended) The method of claim 17, wherein the data values  
2   obtained for the test data set are determined ~~simultaneously~~ in an automated test system.

1                   20.   (Currently amended) The method of claim 1, wherein for the biological  
2   sample of the test subject the set of one or more tests are performed ~~substantially simultaneously~~  
3   in an automated test system.